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ABSTRACT

This study investigated the relationship between day care and young children's language performance. Receptive, expressive and a combined language score plus an intelligence quotient (IQ) were derived for middle-class, Caucasian 3-year-olds from intact families who attended high quality day care since infancy and were compared to the scores of their home-reared counterparts. Parent questionnaires were developed to solicit information about other variables thought to affect language development, including parents' income and education, child's birth order, quantity and type of verbal stimulation by parents, and time parents participated in caregiving. Results revealed that home and day care groups of children did not differ on IQ or any of the three dependent language measures. IQ was found to be the strongest predictor of language performance; birth order ranked second. Fathers' language activity time was significantly related to language performance as was parents' education level. Further, fathers of children in day care reported spending twice as much caregiving time as fathers of children reared at home, while, regardless of child care arrangements, mothers reported approximately equal amounts of time devoted to child care activities. Nearly 50 references are listed. (RH)

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The Relationship of High Quality Day Care to Middle-Class Three-Year-Olds' Language Performance

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Abstract

This study investigated the relationship between day care and young children's language performance. Receptive, expressive and a combined language score plus an IQ score were derived for middle-class, Caucasian three-year-olds from intact families who attended high quality day care since infancy and compared to the scores of their home-reared counterparts. Parent questionnaires were developed to solicit information about other variables thought to affect language development. These variables included parents' income and education, child's birth order, quantity and type of verbal stimulation by parents, and parents' childcare time. Results show that home and day care children do not differ on IQ or any of the three dependent language measures. IQ was found to be the strongest predictor of language performance with birth order ranking second. Fathers' language activity time was significantly related to language performance as was parents' education level. Further, day care fathers reported spending twice as much child care time as home care fathers with home and day care mothers reporting approximately equal child care time.

The Relationship of Day Care to Middle-Class Three-Year-Olds' Language Performance

Over one-third of all married women with children under three are presently employed outside the home, and these numbers are on the rise (Hoffman, 1979). With a rising rate of maternal employment comes a rising rate of infants and toddlers attending day care facilities. Consequently, parents, educators, and researchers now have more vested interest in the effects of day care on infant development than ever before (Belsky & Steinberg, 1978; Ramey, 1981).

To date, there have been very few studies of the effects of day care on infants' development, particularly middle-class infants (Ainsworth, 1979; Dittmann, 1981; Murray, 1975) probably because until recently, middle-class married mothers of infants typically did not work outside the home; they stayed home to care for their babies. But as growing numbers of middle-class parents are placing their infants in day care, they are clamoring for information on the potential effects of day care on their infants' development and finding new answers (Belsky & Steinberg, 1978).

The present study investigated the influence of day care on language development of young children. Specifically, the language performance of middle-class, maternal, home-reared three-year-olds was compared to the language performance of their day care-reared counterparts. Receptive and expressive language performance scores and IQ scores were obtained and compared for day care vs. home-reared children. Variables thought to affect language performance such as quantity and type of verbal stimulation by parents, parent-child activity time, parents' income and education, and child's birth order and number of siblings were also analyzed.

Language was chosen as the developmental variable of primary interest because (1) language involves processes which lie at the heart of a child's cognitive growth and which are central to many other areas of early development, and (2) of all the major developmental areas, language appears to be least represented in extant day care research (Belsky & Steinberg, 1978).

Rapidly growing day care enrollment aside, the notion that the best environment for an infant is at home with his or her mother still prevails in our society. Some day care skeptics argue that daily separation disrupts the natural mother-infant bonding process (Dittmann, 1981; Glickman & Springer, 1978). Others argue that a substitute caretaker typically cannot provide the same quality care, affection, and cognitive stimulation as can an infant's own mother, particularly an educated middle-class mother (Brazelton, 1973; Bell & Ainsworth, 1972; Lewis & Rosenblum, 1974; Osofsky, 1979). In response, most day care research has centered on variables such as mother-infant attachment and bonding (Ainsworth, 1973; Ainsworth & Bell, 1969; Ainsworth, Blehar, Waters & Wall, 1978; Caldwell, Wright, Honig & Tannenbaum, 1970; Kagan, Kearsley & Zelazo 1978; Waters, 1978) environmental factors including caretaker-child ratios, play materials available, curriculum (Belsky & Steinberg, 1978; Moore, 1969; Ricciuti, 1974), child-child interaction patterns and personality factors (McCutcheon & Calhoun, 1976; Moore, 1969; Kagan, Kearsley & Zelazo, 1978) caretaker-child interaction patterns (Beckwith, 1971; Brazelton, 1973; Carew-Watts & Chan-Barnett, 1973; Clarke-Stewart, 1973; Fowler & Swensen, 1975; Frances & Self, 1982; Rutter, 1981; Schachter, 1979), and child's IQ and cognitive development (Cochran, 1977; Doyle, 1975; Moore, 1969).

Research in the area provides compelling evidence that certain conditions seem to foster or hamper early language performance. Among these findings is evidence that both quantity and quality of 1:1 verbal stimulation by an adult,

particularly a middle-class adult, positively correlates with more child vocalization, perhaps earlier vocalization, and better performance on some tests of language and intelligence (Carew, 1980; Haith & Campos, 1977; Fowler & Swensen, 1975; Hess & Shipman, 1965). There is also evidence that auditory overstimulation may negatively affect language development though the exact parameters of such overstimulation have not been determined (Clark & Richards, 1966; Wachs, 1977). From the studies on socioeconomic status and language, we know that middle-class mothers tend to engage in a richer, more complex, and more intellectually stimulating type of verbal interaction with their babies than do lower socioeconomic status mothers; and, their children tend to score higher on tests of language and intelligence (Carew, 1980; Elardo, Bradley & Caldwell, 1975; Haith & Campos, 1977; Hetherington & McIntyre, 1975; Schachter, 1979).

The present study provides direct comparison of day care and home-reared children's language performance scores. A total language score as well as receptive and expressive language scores and an IQ score were derived for middle-class three-year-olds attending day care since infancy. These scores were compared to the scores of their home-reared counterparts. Several other variables which the literature suggests may affect language performance were also analyzed in an effort to assess their relationship to language development. These variables included parents' level of education (Moore & Hofferth, 1979), child's birth order (Dworetzkyy, 1981; Lytton, Conway & Suave, 1977; Zajonc & Markus, 1975), amount of language activity time between each parent and child (Dittmann, 1981; Frances & Self, 1982), amount of total interaction time between each parent and child (Dittmann, 1981; Frances & Self, 1982), amount of total interaction time between each parent and child (Beckwith, 1971; Hoffman, 1979), type of language stimulation (Carew, 1980; Elardo, Bradley & Caldwell, 1975; Todd & Palmer, 1968), and parents' income (Belsky & Steinberg, 1978; Rutter, 1981).

It was predicted that day care and home-reared children would not differ on any of the three measures of language performance (expressive, receptive, or total score). It was further predicted that child's IQ would be positively correlated with total language score and that of any of the predictor variables, IQ would account for the most variance in language score performance. It was also thought that mothers' level of education and quantity of parental verbal stimulation each would be positively correlated with child's total language score.

Method

Selection of Day Care Centers

Since a sample of middle-class children was needed, two day care centers were selected which serve a predominately middle to upper-middle class population in the metropolitan Memphis area. The two centers are considered to provide excellent care as judged by caretaker-child ratio, materials available, caretaker qualifications and curriculum, which all fell within the guidelines recommended by the National Day Care Study (Ruopp, Travers, Blantz, & Coelen, 1979). Only high quality centers were considered for selection so that the hypothesis under consideration could be tested under the most stringent of conditions. That is, if middle-class home-reared children scored higher on language tests than did children reared in poorly staffed, poorly stocked day care centers where caretaker-child ratios were low, score differences might be attributed to the poor quality of the day care centers rather than to conditions intrinsic to day care per se. However, if under optimal conditions, differences between day care and home-reared children were found, the implications of these differences would be more noteworthy and generalizable to day care in general.

Subjects

Subjects consisted of 40 three-year-olds enrolled in either the Child Enrichment Centers (CEC) or the Children's School (CS). Children at these centers whose third birthday fell between January, 1982 and January, 1983 were contacted for inclusion in the study. Those children who received parental permission to participate but were not from intact families, were then deselected without being tested. Since divorce or parental separation can significantly affect a young child's emotional as well as cognitive development (Belsky & Steinberg, 1978), and can also affect quantity and quality of total parental time spent with the child, only scores from children in intact homes were included in the analyses.

Also, only scores from Caucasian children were included in the analyses to avoid both the "culture-free" issues affecting selection of measurement instruments (Sattler, 1974) and to avoid the heredity-quagmire surrounding the study of black children's language and intelligence scores (Golden & Birns, 1976).

Furthermore, an initial attempt was made to match children in the day and home care groups for sex since there is suggestive evidence that girls' early verbal development may be superior to that of boys (Leach, 1980). However the small sample size precluded such matching. Subsequent analyses indicated no significant differences between the language or IQ scores of boys and girls for the home or day care groups. Thus no attempt was made to include a third day care center and recruit additional subjects in order to match the groups for sex of child. Subsequent analyses also failed to find significant care group differences on any of the demographic variables (family income, parents' education, birth order) under consideration. Therefore it was assumed that the home and day care groups were demographically comparable.

Day care group. The day care group (DC) consisted of 22 three-year-olds, 10 boys and 12 girls. Their mean age of initial entry into day care was 5.4 months

with a range from 6 weeks to 16 months (median age of enrollment was 4 months. Of the 22 children, 9 were only children with a total of 12 or 55% first born. Their average number of siblings was .59 with a range from 0 to 2. The average IQ of the day care group was 113.

Home care group. The home care group (HC) was comprised of 18 three-year-olds who had either never attended full-day care or who had attended day care for less than three months as of the time of testing and had been reared at home prior to testing. The recruitment of home care children by advertising in the newspaper, or soliciting participants from well-baby clinics, etc. was decided against. It was thought that effects from extraneous variables could best be minimized by selecting both care groups from a common environment (i.e., parents who enrolled their children at one of two day care centers).

The home care groups thus included: (1) children from the two centers who had previously been reared at home and had begun day care for the first time at the age of three. It was assumed that after spending the first three years of their lives home with their mothers, their current three month experience in day care would not significantly affect their present language performance, (2) children from one of the centers who attended either the morning or afternoon three hours nursery program and whose mothers were not employed outside of the home. Admittedly these children were away from their mothers for approximately three hours per day. But it was thought that such a brief separation would not affect language and cognitive development, particularly since this was the first year that these children had attended nursery school.

In total, the home care sample consisted of 12 boys and 6 girls with no significant differences between either language or IQ scores based on sex of child. Of the 18 children, 8 were only children with a total of 10 or 50% first born. The

average number of siblings was .66 with a range from 0 to 3. The average IQ score was 119.

Procedure

The directors at the two centers provided a list of three-year-olds who they thought met the criteria necessary for inclusion in the study (e.g., had attended day care since infancy or had not been enrolled in day care prior to the age of three). Next a letter was sent to the selected children's parents briefly describing the project and requesting permission for their child's participation. The study was described as an investigation of the cognitive development of three-year-olds. No explicit mention was made that an intelligence test would be given. Parents were offered the opportunity to discuss their child's general performance (strengths and weaknesses) with the experimenter after their child was tested. Of those parents receiving permission forms, only one from CS and one from CEC either denied permission or failed to return the signed form.

Upon receipt of parental permission, a questionnaire was sent to each participating child's parents soliciting a variety of demographic data as well as estimates of amount of interaction time and language skills time each parent spends with their child. Parents who did not promptly return the questionnaire were sent a follow-up letter reminding them to do so. Three questionnaires from children who met the criteria for inclusion in the study were not returned. Their language and IQ scores were included in the analyses as were some personal demographic data provided by the day care centers (e.g., birthday, number of siblings, age of entry in to day care, birth order, parents' occupation). However, no data were available for the amount of parental interaction time spent with their child or time spent by parents in language activities. Three other children who were age eligible for the study were excluded after it was learned that they no longer resided in intact homes.

Questionnaire Development

A questionnaire entitled Day Care Study Questionnaire was designed to solicit independent or predictor variables thought to be important. These included mothers' highest level of education (MEDUC) and fathers' highest level of education (FEDUC) which were coded on a five point scale (1 = high school grad, 2 = some college, 3 = B.A./B.S., 4 = M.A., 5 = Ph.D./M.D./J.D.). Information about family income was solicited and calculated on a four point scale (1 = below $15,000, 2 = $15-25,000, 3 = $25-40,000, 4 = over $40,000). Child's birth order (BIRTH) and child's number of siblings (SIBS) were also recorded.

Several variables served as measures of parent-child interaction time. Mothers' Weekday Time (MWT), Fathers' Weekday Time (FWT), Mothers' daily Weekend Time (MWET), Fathers' daily Weekend Time (FWET), each parent's combined five day week plus two day weekend time or Total Time (MTTIME, FTTIME) and mothers' and fathers' combined total time or Parents' Total Time (PTTIME) were asked for. Parents provided estimates of these times in numbers of hours per day. Those home care mothers whose children were now in full day care, were asked to provide estimates based on interaction time prior to their child's day care attendance.

Eleven language activities were selected for inclusion in the questionnaire which developmental experts suggested as age and stage appropriate for three-year-olds (Coon, 1981). Mothers' and fathers' time spent on each language activity was calculated separately (Mothers' Language Activity Time 1-11 and Fathers' Language Activity Time 1-11) using a five point scale (1 = rarely or never, 2 = occasionally, but not on a regular basis, 3 = 15-20 minutes per week, 4 = 15-20 minutes several times per week, 5 = 15-20 minutes each day). Total time spent on

all eleven activities was then calculated for each parent (Mothers' Language Activity Time, MLAT and Fathers' Language Activity, FLAT) and for both parents' combined time (Parents' Language Activity Time, PLAT).

Measurement Instruments

Zimmerman Preschool Language Scale. Each child was administered the Zimmerman Preschool Language Scale (PLS) which is a test of receptive and expressive language preformance. The test also yields a total language score which is the numerical average of the receptive and expressive scores (Zimmerman, Steiner & Pond, 1979). The PLS is the only available instrument designed for preschool age children which provides separate receptive (ACQ) and expressive (VAQ) scores. It was thought that since day care children are in the company of other children all day, they may have more need and opportunity for expressive speech than do home-reared children who typically have only their one caretaker to talk to much of the time. On the other hand, home care children have more opportunity for 1:1 verbal contact with a language competent adult. Therefore, receptively, their performance may surpass that of day care children who are immersed daily in a communication world peopled primarily by other children whose speech is less competent, complex and rich than an adult's (Carew, 1980; Rutter. 1981). Thus, if such differential abilities do exist, it was hoped that the dual expressive and receptive language scores provided by the PLS would tap such differences.

Other merits of the PLS include ease of administration and scoring, clear and attractive test materials designed to maintain the young child's interest, and reasonable administration time (approximately 15-30 minutes for a normal three-year-old). Reliability coefficients for the PLS range from a low of .75 to a high of .92 using a split-half design (Zimmerman, et al., 1979). Also the PLS has a high positive correlation ($r = .97$) with the Illinois Test of Psycholinguistic Abilities

(ITPA) which is a widely accepted measure of language functioning but has a much longer administration time than does the PLS.

Stanford Binet Scales of Intelligence Form L-M. The Stanford Binet Form L-M was selected as the intelligence test of choice since it is a well recognized, time-tested instrument which can be used with preschool age children. Also, it ostensibly measures not only language ability but other facets of intelligence, e.g., spatial abilities, abstract reasoning, motor skills, etc. (Terman & Merrill, 1973). Further, the test items are varied and test materials are attractive to young children. The Stanford Binet typically requires 30-45 minutes to administer to a three-year-old.

Results

Comparability of Groups

Preliminary analyses comparing the home and day care samples on selected demographic variables were performed to determine comparability of the two groups (See Table 1). First, two-tailed t-tests were conducted and no significant differences between home and day care groups were found for the variables Birth Order (Home Care, $HC\bar{X}$ = 1.5, Day Care, $DC\bar{X}$ = 1.4), IQ (HCX = 118.9, $DC\bar{X}$ = 113.3), or Number of Siblings ($HC\bar{X}$ = .706, $DC\bar{X}$ = .656). The two groups were thereafter regarded as comparable in regard to these demographics.

Insert Table 1 about here

Chi-square analyses were then performed to determine if the home and day care samples differed on the variables Mothers' and Fathers' Highest Level of Education. A 2 x 5 design (caretype by levels of education) was used for each parent sample. No significant differences were found between home and day care

Table 1

Comparison of Home Care and Day Care Means and Standard Deviations on the Predictor Variables

	HOME CARE	DAY CARE	SIGNIFICANCE
LAQ (Total Language Score)	M = 123.89 SD = 12.787	M = 126.41 SD = 17.462	NS
ACQ (Receptive Language Score)	M = 127.11 SD = 11.726	M = 126.68 SD = 15.223	NS
VAQ (Expressive Language Score)	M = 120.22 SD = 15.58	M = 125.81 SD = 23.138	NS
IQ	M = 118.94 SD = 14.95	M = 113.3 SD = 15.419	NS
MLAT (Mothers' Language Activity Time)	M = 3.68 SD = .675	M = 3.4 SD = .741	NS
FLAT (Fathers' Language Activity Time)	M = 2.75 SD = .762	M = 3.07 SD = .741	NS
MTTIME (Mothers' Total Care Time)	M = 32.34 hrs/wk SD = 14.53	M = 36.95 hrs/wk SD = 9.795	NS
FTTIME (Fathers' Total Care Time)	M = 14.59 hrs/wk SD = 8.66	M = 29.75 hrs/wk SD = 8.88	$p < .05$
PTTIME (Parents' Total Care Time)	M = 46.93 hrs/wk SD = 11.60	M = 66.7 hrs/wk SD = 9.34	$p < .05$
BIRTH ORDER	M = 1.5 SD = .80	M = 1.4 SD = .605	NS
INCOME	M = 2.295 SD = .845	M = 2.35 SD = 1.165	NS
MEDUC (Mothers' Education)	M = 3.706 SD = .985	M = 3.1 SD = 1.165	NS
FEDUC (Fathers' Education)	M = 3.706 SD = 1.263	M = 2.85 SD = 1.182	NS

* $p < .05$, ** $p < .01$, NS = not significant

Language Activity Scores - 1 = rarely or never, 2 = occasionally, 3 = 15-20 minutes/week, 4 = 15-20 minutes several times/week, 5 = 15-20 minutes per day

Parents' Education Scores - 1 = high school, 2 = some college, 3 = B.A./B.S., 4 = M.A., 5 = Ph.D./M.D./J.D.

mothers' education level ($X2$ (4) = 5.396, p = .249) nor between home and day care fathers' education level ($x2$ (4) = .5363, p = .252). Chi square analyses were again performed to determine if home and day care samples differed on the variable of Family Income. Using a 2 x 4 design (caretype by income bracket) the analysis yielded no significant effects ($x2$-(3) = .241, p = .9706). Thus there was no basis for concluding that either parental level of education or family income differed across the home and day care groups.

Since the experimental groups were drawn from two different day care centers, further analyses were conducted to see whether the samples of children drawn from each day care center differed as a function of day care center. Accordingly, home and day care children's LAQ scores (combined language quotient) were analyzed by school using a 2 x 2 ANOVA. No significant main or interactive effects were found. Thus there was no basis for assuming that children's language performance differed as a function of day care center per se.

Discriminant Analysis of Home and Day Care

A stepwise discriminant analysis (Wilks Lambda) was performed to determine if the home and day care groups could be differentiated by certain predictor variables. These variables included combined language scores (LAQ), expressive language scores (VAQ), receptive language scores (ACQ), mothers' total childcare time (MTTIME) and fathers' total childcare time (FTTIME). Results show that none of these variables entered into the analysis. Therefore, none formed a reliable basis for discriminating between home and day care groups. Individual t-tests were thus conducted to determine if the home and day care groups differed on any individual predictor variables.

Language Performance

To determine if home and day care children differed on language performance scores, two-tailed t-tests were performed for each of the three

subscales of the PLS. No significant group differences were found for LAQ (combined), VAW (expressive), or ACQ (receptive) language quotients. Differences between home and day care children's language scores were slight with day care children scoring higher than home care children on LAQ ($\overline{DCX}$ = 126.09, $\overline{HCX}$= 123.89) and on VAQ ($\overline{DCX}$ = 125.81, $\overline{HCX}$ = 120.22). The home care group had the highter ACQ scores ($\overline{HCX}$ = 127.1, $\overline{DCX}$ = 126.68). Thus as originally hypothesized, home and day care children did not differ on any of the three dependent measures of language performance (auditory, receptive, or combined) under study.

Parents' Child Care Time

Two-tailed t-tests were also performed to compare home and day care groups on parents' reported care and play time with their child. Variables in these analyses included Mothers' Average Weekday Time, Mothers' Average Weekend Time, Mothers' Combined Total Time, Fathers' Average Weekday Time, Fathers' Average Weekend Time, Fathers' Combined Total Time, and both parents' Combined Total Time with their child (see Table 1). The only statistically significant differences found between the two groups were for Fathers' Combined Total Time ($t = 3.19$, $p < .05$) and for both parents' Combined Total Time ($t = -3.14$, $p < .05$). This latter effect is probably due to higher totals for fathers' language time.

Fathers of home care children reported spending an average of 3.37 hours per weekend day and 1.57 hours per weekday engaged in activities with their child for a total of 14.59 hour per week. Day care children's fathers reported spending an average of 5.5 hours per weekend day and 2.75 hours per weekday in activities with their child for a total of 29.75 hours per week. Thus day care fathers reported spending almost twice as much child care time per week as did home care fathers.

Interestingly, day care mothers reported spending slightly more time engaged in direct child care activities than did home care mothers. Though both groups of mothers reported weekday child care time was approximately equal ($HC\bar{X}$ = 3.88 hours per day, $DC\bar{X}$ = 3.95 hours per day), day care mothers reported spending an average of 32.34 hours per week in child care compared to day care mothers' reports of 36.95 hours per week.

Language Activity Time

Next, differences between groups in amount of parent-child language activity time were analyzed using t-tests. No significant differences were found between home and day care children for Mothers' Total Language Activity Time, Fathers' Total Language Activity Time or Parents' combined Total Language Activity Time or Parents' combined Total Language Activity Time.

While parents' language time was not related to caretype, it was related to LAQ, total language scores on the PLS ($r = .328$, $p < .05$). Thus, amount of parents' language stimulation was related to children's language stimulation a child received was not influenced by their home or day care status.

Analyzing each of the eleven language activities separately, results indicated home care mothers spent significantly more time each week engaged in MLA7 "Teach your child correct grammar and sentence structure," than did day care mothers ($t = 2.416$, $p < .05$). Day care fathers reported spending significantly more time than did home care fathers on FLA6, "Teach your child correct pronunciation of words," ($t = 2.140$, $p < .05$), FLA10 "Help your hcild to learn the alphabet," ($t = 3.357$, $p < .01$), and FLA11, "Help your child with counting skills," ($t = 3.359$, $p < .01$). In general, home care mothers reported spending slightly more time in language activities than did day care mothers while day care fathers reported spending more language activity time than did home care fathers but these differences did not approach significance (see Table 2).

Insert Table 2 about here

To determine which, if any, of the eleven language activities was significantly related to language achievement on the Preschool Language Scale, each activity was correlated with LAQ scores using the Pearson Product Moment coefficient (see Table 2). For mothers, results were significant for items MLA1, "Teach your child the name of objects/events in his or her environment, ($r = .34$, $p < .05$), MLA3, "Engage in extended two-way conversation in which both you and your child provide information and responses," ($r = .60$, $p < .01$), and MLA10, "Help your child to learn the alphabet," ($r = .27$, $p < .05$). For fathers, significant correlations were found for FLA1, "Teach your child the name of objects/events in his or her environment," ($r = .30$, $p \leq .05$) and FLA7, "Teach you child correct grammar and sentence structure," ($r = .283$, $p < .05$). Significant positive relationships were found between parental time spent on each of these language activities and subsequent child language achievement scores.

In another analysis, amount of time engaged in each of the language activities was calculated separately for mothers and fathers across caretype. Of the eleven language activities, results indicated Language Activity 3, "Engaged in extended two-way conversation in which both you and your child provided information and responses," was reportedly the most frequently engaged in language activity by both mothers and fathers regardless of caretype. Mothers' Language Activity 4, "Read stories to your child," was the second most frequent

Table 2

Home and Day Care Mothers' and Fathers' Language Activity Times for Each Language Activity

Language Activity	Home Care Mother	Day Care Mother	Home Care Father	Day Care Father
1. "Teach your child the name of objects/ events in his/her environment"	M = 4.23 SD = .832	M = 3.85 SD = 1.04	M = 3.25 SD = 1.342	M = 3.55 SD = 1.05
2. "Engage in verbal naming/questioning games"	M = 4.176 SD = .287	M = 3.7 SD = .979	M = 3.125 SD = 1.31	M = 3.35 SD = 1.089
3. "Engage in extended two-way conversation"	M = 4.862 SD = .332	M = 4.9 SD = .308	M = 4.125 SD = 1.204	M = 4.05 SD = 1.05
4. "Read stories to your child"	M = 4.294 SD = 1.160	M = 4.0 SD = 1.170	M = 3.187 SD = 1.559	M = 3.2 SD = 1.152
5. "Read or recite nursery rhymes with your child"	M = 2.941 SD = 1.345	M = 3.1 SD = 1.165	M = 2.188 SD = .911	M = 2.5 SD = 1.277
6. "Teach your child correct pronunciation of words"	M = 3.941 SD = 1.298	M = 3.25 SD = 1.095	M = 2.562 SD = 1.031	M = 3.3* SD = 1.031
7. "Teach your child correct grammar and sentence structure"	M = 3.588 SD = 1.372	M = 2.6* SD = 1.095	M = 2.625 SD = 1.147	M = 2.4 SD = 1.142
8. "Help your child develop concepts of color and shape"	M = 3.059 SD = 1.144	M = 2.75 SD = 1.164	M = 2.437 SD = 1.031	M = 2.6 SD = 1.046
9. "Help your child develop concepts of color and shape"	M = 3.294 SD = 1.160	M = 3.15 SD = 1.04	M = 2.437 SD = 1.031	M = 2.8 SD = .951
10. "Help your child to learn the alphabet"	M = 2.941 SD = 1.249	M = 3.1 SD = .912	M = 1.687 SD = .704	M = 2.85** SD = 1.137
11. "Help your child with counting skills"	M = 3.176 SD = 1.074	M = 3.1 SD = 1.021	M = 2.125 SD = .957	M = 3.2** SD = .951

1 = rarely or never, 2 = occasionally, 3 = 15-20 min./wk., 4 = 15-20 min. several times per week, 5 = 15-20 min./day

* $p < .05$, ** $p < .01$

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language activity for mothers with Fathers' Language Activity 1, "Teach your child the names of objects/events in his or her environment," the second most frequent language activity for fathers.

Predictor Variable Intercorrelations

Intercorrelations between all of the predictor variables were computed for the overall sample using Pearson Produce-Moment coefficients (see Table 3). Several of the resulting correlations were significant. As predicted, LAQ was positively and significantly correlated with IQ ($r = .601$, $p < .01$). Those with higher total language scores also tended to have higher IQs. LAQ was also positively correlated with parents' Combined Language Activity Time ($r = .328$, $p < .05$) and Family Income ($r = .366$, $p < .05$). These findings suggest that language performance is positively related to both the amount of time parents spend engaged in language activities with their child and to the economic status of parents.

Insert Table 3 about here

As originally hypothesized, IQ was positively and significantly correlated with mothers' education ($r = .423$, $p < .01$) and also with fathers' education ($r = .368$, $p < .05$). Children with higher IQs tended to have parents with more years of schooling than did children with lower IQs.

Birth order was found to be significantly negatively related to parents' language activity time. Specifically, negative correlations were also found for birth order and Mothers' Total Language Activity time ($r = -.428$, $p < .01$), Fathers' Total Language Activity time ($r = .333$, $p < ..05$) and parents' combined Total Language Activity time ($r = .488$, $p < .01$). That is, first born or only children

Table 3

Correlation of Predictor Variables

	LAQ	CARETYPE	IQ	MEDUC	FEDUC	PLAT	MLAT	FLAT	INCOME	SEX	BIRTH	MTTIME	FTTIME
LAQ (Total Language Score)	1.00												
CARETYPE	.074	1.00											
IQ	.601**	-.215	1.00										
MEDUC (Mothers' Education)	.225	-.263	.423**	1.00									
FEDUC (Fathers' Education)	.199	-.350	.368*	.407**	1.00								
PLAT (Parents' Language Activity Time)	.328*	.026	.085	.061	-.058	1.00							
MLAT (Mothers' Language Time	.249	-.246	.047	.175	-.261	.720**	1.00						
FLAT (Fathers' Language Time	.256	.243	.080	-.061	.137	.813**	.182	1.00					
INCOME	.336*	.096	.303	.281	.221	.084	.018	.104	1.00				
SEX OF CHILD	-.114	.189	.106	.182	-.121	-.324**	-.036	-.429**	.056	1.00			
BIRTH ORDER	-.248	-.036	.149	.177	.182	-.488**	-.428**	-.333*	-.228	.239	1.00		
MTTIME (Mothers' Total Care Time)	.038	.253	.051	.127	-.284	.131	.297	-.064	.344	.128	-.048	1.00	
FTTIME (Fathers' Total Care Time)	-.018	.479**	-.249	-.008	-.101	.426**	-.006	.609	.021	-.257	-.215	.068	1.00
PTTIME (Parents' Total Care Time)	-.019	.474**	-.103	.048	-.279	.348*	.228	.302	.280	-.049	-.161	.818**	.630**

* $p < .05$, ** $p < .01$

received significantly more mother, father, and both parents' combined language stimulation time than did later born children in this study.

While the above finding is consonant with previous birth order research, an unanticipated finding was that Fathers' Language Activity time was significantly correlated with sex of child ($r = .429$, $p < .01$) with sons tending to receive significantly more time than daughters. Additionally, Fathers' Language Activity time was significantly positively correlated with Fathers' combined Total Time in child care and play ($r = .609$, $p < .01$) but this relationship was not found for mothers.

A positive correlation also occurred between Mothers' combined Total Time in child care and play and Family Income ($r = .344$, $p > .05$) but not between Fathers' combined Total Time with child and Income ($r = .021$, $p < .05$). Mothers with higher family incomes reported spending more time engaged in child care than mothers with lower family incomes. This may be partly attributable to the finding that day care mothers reported spending slightly (but not significantly) more child care time (MTTIME) than homecare mothers and also reported both spouses work.

Lastly, a stepwise multiple regression analysis was conducted to determine which of the predictor variables contributed the most to the language (LAQ) scores. Results indicated that IQ accounted for approximately 36% of the variance in LAQ with Birth Order accounting for approximately another 11% of the variance ($R^2 = .48$, $F(2,33) = 15.10$, $p < .001$). None of the other variables were entered into the equation. So as initially hypothesized, IQ was the single most significant portion of the variance of LAQ. Caretype was not found to account for any significant portion of the variance of LAQ.

Discussion

Previous research has suggested that quantity and quality of verbal stimulation affect a child's early language performance (Brazelton, 1973; Carew, 1980; Cochran, 1977; Frances & Self, 1982; Rutter, 1981). Other research has implied that a day care environment may provide less opportunity for such stimulation than does a middle-class, other present home environment (Dittmann, 1981; Belsky & Steinberg, 1978). Recent studies by McCartney (1984) and associates (McCartney, Scarr, Phillips and Grajek 1985) have shown the importance of varying quality programs on the child's development including language skills. In the present study, the language performance of children raised since infancy in day care and home care was compared. Results indicated no significant differences in language performance between middle-class three-year-olds reared at home and those reared in high quality day care.

There was initial suspicion that home and day care children may differ on expressive and receptive performance due to different language opportunities available in each care environment. In fact, day care children did score 5 points higher on expressive language (VAC) than did home care children but this difference was not statistically significant and so no conclusions can be drawn. Receptive scores (ACQ) were approximately equal for both groups. The evidence failed to support a relationship between caretype and receptive, expressive, or total language performance in three-year olds.

Instead, as initially predicted, variables other than caretype emerged as significantly related to children's language. Of the independent variables under investigation (see Table 3), IQ was found to be the single best predictor of language performance, accounting for 36% of the variance in LAQ (average receptive and expressive language score). Those children with higher IQ scores also tended to have higher LAQ scores regardless of caretype.

The meaningfulness of this relationship may be somewhat diluted, however, by the overlap in abilities assessed by the Zimmerman Preschool Language Scale (PLS) and the Stanford Binet Scales of Intelligence. Both instruments are heavily verbally weighted and test such skills as identification of picture objects, numerical reasoning, comprehension, abstract expression, and following directions. Nonetheless, the two instruments also have clear areas of divergence. The PLS includes items assessing sensory discrimination, articulation, verbal expression, and grammatical fluency (Zimmerman, Steiner, & Pond, 1979). The Stanford Binet additionally assesses visual motor ability, vocabulary, conceptual thinking, reasoning, problem solving, and memory (Sattler, 1974; Terman & Merrill, 1973). So though both measures are reliant on verbal skills, they do differ in purpose, emphasis and scope. It seems warranted to conclude that the relationship found between LAQ and IQ, as measured by the PLS and Stanford Binet respectively, is more than an artifact of the testing instruments selected.

Birth order was found to account for the second most variance in LAQ scores (12%) with early birth order positively correlated with LAQ. The birth order finding is consistent with earlier work indicating that only children and first borns advance more rapidly in language development and are more articulate than later born children (Dworetsky, 1981; Zajonc & Markus, 1975). Further evidence indicates twins develop language at a slower rate than first borns and triplets develop more slowly still (Lytton, Conway, & Suave, 1977).

In the present study, parents' combined language Activity Time was negatively correlated with birth order while parents' childcare and play time (PTTIME, FTTIME, MTTIME) was not significantly related to birth order. This suggests that birth order is more strongly related to the quality of parent-child interaction time than to absolute quantity of time. Perhaps parents' attention is

divided or dispersed when with two or more children producing less language focused quality time.

The present results are consistent with previous research findings that language performance is not related to the availability of play materials or adult presence per se but, instead, is related to the quality (guidance by an adult) of the child-caretaker interactions (Carew, 1980; Cazden, 1966; Clarke-Stewart, 1973; Rutter, 1981; Todd & Palmer, 1968). It follows that unless mothers of home-reared children specifically use their daily childcare time for language stimulation, their daytime availability, by itself, may not tend to significantly affect their child's language performance. However, as was found in previous studies (Hoffman, 1979; Moore & Hofferth, 1979) home-reared children do not tend to receive more parent interaction time or language stimulation time than do day care children. The home and day care mothers in the present study reported spending approximately the same amount of language activity time with their children and approximately the same number of weekday hours engaged in care and play activities. Moreover, day care mothers reported spending approximately 2 hours more per weekend day engaged in child activities than did home care mothers.

Fathers' patterns of child care time differed from those of mothers. Fathers of day care children reported spending one hour more per weekday and two hours more per weekend day engaged in care and play activities. That husbands of working women would spend more weekday time engaged in child care is not surprising since their wives have comparatively less available time. But husbands of working mothers also reported spending more weekend childcare time than did husbands of nonworking mothers.

A look at mothers' and fathers combined child activity time for both weekdays and weekends (PTTIME) shows that day care children's parents reported spending approximately 15 hours more per week with their child than did home

care parents. Most of this difference was attributable to the proportionately greater amount of time reported by day care fathers than by home care fathers. So despite the working status of both their parents, the day care children in this study reportedly received more parental child interaction time than did their home care counterparts and approximately an equal amount of direct language stimulation time. Based on these figures, day care per se did not limit either quantity or quality (as defined by the eleven language activities) of parents-child interactions.

Of the eleven language activities included in this study, both mothers and fathers, regardless of caretype, reported spending the most time "Engaged in extended two-way conversation in which both you and your child provide information and responses." This finding is not surprising since two-way conversation is the most natural and perhaps the most mutually stimulating of the eleven activities. Also conversation can be initiated by the child as well as the parents and can occur in any context or setting thus providing greater opportunity for occurrence. While significant relationships between a few of the specific language activities and caretype emerged, these relationships were unanticipated and remain difficult to explain. The multiple independent analyses conducted may have affected these findings by magnifying the probability of false positive results. More research is needed to clarify the relationship between caretype and specific parents-child language activities.

An unexpected significant correlation was found across caretype for Fathers' Language Activity Time (FLAT) and sex of child, with sons receiving more father language time than daughters. In contrast, mothers reported spending slightly more care and play time with daughters and approximately equal language time with sons and daughters.

The above findings are consistent with previous research results that sons tend to receive more father interaction time than do daughters (Gerwitz &

Gerwitx, 1968; Lamb & Lamb, 1976; Rebelsky & Hanks, 1971; Redina & Dickerscheid, 1976). A clear preference by boys for their father (as measured by more touching, approaching, asking to be picked up) is then shown by the end of the second year which, in turn, provides for increased father son interaction (Wolman, 1982). Therefore, the greater father-son interaction time in the present study may reflect the typical sex role function of fathers and sons. Maybe, as Parke and Sawin (1976) note, "Fathers really do prefer boys--especially first born boys" (p. 370).

Fathers' Language Activity Time (FLAT) was also significantly correlated with Fathers' Total child care Time (FTTIME) in a positive direction while this relationship did not obtain for mothers. It may be that fathers engage in a more limited range of parent-child activities than do mothers with language stimulation accounting for a greater proportion of fathers' child interaction time. It should be noted that the small variances between mothers' language activity times and between mothers' total childcare times would have attenuated any statistical relationship between these variables.

Another unexpected finding was the positive correlation between Mothers' Total Time in childcare (MTTIME) and family income, especially given the homogeneity of participating parents' socioeconomic status. Speculatively, one might infer from these results, a trend for individuals who earn less to work at perhaps more physically demanding jobs requiring longer or more inflexible hours. That is, parents with lower paying jobs may be more tired and have less physical energy to spend with their children than do people with higher paying jobs.

One last relationship remains to be discussed. A significant correlation was found for children's IQ scores and both mothers' level of education (MEDUC) and fathers' level of education (FEDUC). Parents with more years of formal education tended to produce children with higher IQs. A position correlation between adult

IQ and education level has long been recognized (Anastasi & Foley, 1958; Cronbach, 1970; Hess & Shipman, 1965). However, it remains unclear whether the correlation between offspring's IQ and parents' education level is attributable more to hereditary or environmental factors. There is a strong hereitability factor in intelligence scores (Rutter, 1981). Thus higher IQ parents who also tend to have more education, may genetically breed higher IQ children. Another possibility is that parents with more education may be more skilled in stimulating their child's cognitive and language development than parents with less education. In this way, environmental factors may underlie the IQ/education level relationship.

In short, while this study shows no significant correlation between caretype and language performance, variables long thought to affect cognitive development emerged as significantly related to children's language scores. A note of caution is warranted in interpreting these relationships since multiple independent analyses were performed which would increase the probability of false positive findings. On the other hand, several of the relationships were predicted at the outset and also have been documented in previous studies.

It should be noted that the day care children in this study attended "good" day care centers where teacher-child ratios met the national guidelines. Teachers involved all had B.A. or M.A. degrees, the facilities were spacious and well stocked with age appropriate, educational materials and daytime activities were prescribed by a curriculum designed by developmental specialists. Therefore, one cannot generalize from this study that all day care settings are, at worst, innocuous. Some substandard settings may deleteriously affect a child's cognitive development.

One last point, it must be recognized that we know little about the long term effects of day care, and more importantly, a day care society. Recent research concerned with the quality of day care and some of its specific effects is a welcome development. (Howes and Robenstein, 1985; Howes and Eldridge, 1985).

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